IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Appl. No. : 10/536,642

Applicant(s): David N. Roundhill, et al.

Filed: May 27, 2005

TC/A.U.: 2600/2624

Examiner: Mekonen T. Bekele

Atty. Docket: US 020471 US

Confirmation No.: 4312

Title: SEGMENTATION TOOL FOR IDENTIFYING
    FLOW REGIONS IN AN IMAGE SYSTEM


## APPEAL BRIEF


Honorable Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450


Sir:

In connection with the Notice of Appeal dated April 21, 2009, Applicants provide the following Appeal Brief in the above-captioned application

## 1. Real Party in Interest

The real party in interest as assignee of the entire right and title to the invention described in the present application is Koninklijke Philips Electronics, N.V., having a principal place of business at Groenewoudseweg, 1Eindhoven, NL 5621 BA .

## 2. Related Appeals and Interferences

There are no known related appeals or interferences in the present application.

## 3. Status of the Claims

Claims 1-19 are presently pending in the application. Claims 20-35 are cancelled. Claims 1-19 are the subject of the present appeal, and are reproduced in the Appendix.

## 4. Status of the Amendments

A Response under Rule 116 was filed on March 23, 2009. An advisory action was mailed on April 14, 2009. The Advisory Action indicates that the Response was entered.

## 5. Summary of the Claimed Subject Matter[1]

**Referring to claim 1:**

In accordance with a representative embodiment, a method of capturing an image using an ultrasound system (e.g., 10 Fig. 1) surveying the image (e.g., via survey system 12, Fig. 1) to collect motion data. The method comprises analyzing the motion data to identify a flow in the image (e.g., via segmentation system 12, Fig. 1). Moreover, the method comprises scanning a limited region (e.g., region of interest 33, Fig. 1) of the

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[1] In the description to follow, citations to various reference numerals, drawings and corresponding text in the specification are provided solely to comply with Patent Office Rules. It is emphasized that these reference numerals, drawings and text are representative in nature, and in not any way limiting of the true scope of the claims. It would therefore be improper to import any meaning into any of the claims simply on the basis of illustrative language that is provided here only under obligation to satisfy Patent Office rules for maintaining an Appeal.

image containing the flow with a flow imaging technique. (Kindly refer to Fig. 1; page 5, line 1 through page 6, line 12 for additional details).

**Referring to claim 12:**

In accordance with another representative embodiment, an ultrasound system (e.g., 12, Fig. 1) comprises a survey system (e.g., 12, Fig. 1) for collecting motion data from a target image (e.g., target volume 32). The ultrasound system comprises a segmentation system (e.g., 18, Fig. 1) for mapping a region of flow (e.g., region of interest 33) within the image based on the motion data. The ultrasound system comprises a flow acquisition system (e.g., 26 Fig. 1) that automatically limits the collection of flow image data within the image to the region of flow. (Kindly refer to Fig. 1; page 5, line 1 through page 6, line 12 for additional details).

**6. Grounds of Rejection to be Reviewed on Appeal**

The grounds of rejection to be reviewed on appeal are the rejections of claims 1-19 under 35 U.S.C. § 102(b) in view of *Sumanaweera* (US Patent 6,475,149).

**7. Argument**

At the outset Applicants rely at least on the following standards with regard to proper rejections under 35 U.S.C. § 102. Notably, a proper rejection of a claim under 35 U.S.C. § 102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983). Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. *See, e.g., In re Paulsen*, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Alternatively, anticipation requires that each and every element of the claimed invention be embodied in a single prior art device or practice. *See, e.g., Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992). For anticipation, there must be

no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *See, e.g., Scripps Clinic & Res. Found. v. Genentech, Inc.,* 927 F.2d 1565, 18 USPQ2d 1001 (Fed. Cir. 1991).

i. Claim 1:

Claim 1 recites:

*A method of capturing an image using an ultrasound system, comprising:*

> *surveying the image to collect motion data;*
>
> *analyzing the motion data to identify a flow in the image; and*
>
> *scanning a limited region of the image containing the flow with a flow imaging technique.*

The Office Action directs Applicants to column 2, lines 25-26, column 3 lines 23-24 and, in the Response to Arguments, column 4, lines 3-4 and 20-25 for the emphasized portion of claim 1. Applicants respectfully submit that the applied art fails to at least the emphasized portion of claim 1. Notably, the portion of column 2 relied upon discloses that:

"Both tissue and fluid data are used to detect vessel or organ borders. Fluid data, such as ultrasound Doppler data, more clearly or sharply identifies tissue-to-fluid borders, such as vessel borders closer to the transducer."

Nowhere is there any description of surveying an image as claimed. Rather data are used to detect borders.

Column 3, lines 24-28 state:

"The Doppler processor 18 detects Doppler data representing flowing fluid. The Doppler data is obtained for a two-dimensional region of the patient. The Doppler processor 18 detects frequency shifts associated with the Doppler effect of moving or flowing fluid on the transmitted or received signals."

Again, there is no disclosure of surveying an image. Rather the function of a Doppler processor is described.

Column 4, lines 3, 4 and 20-25 recite:

"In one embodiment, ultrasound data is stored as image data combined from B-mode and Doppler data...

The acquired data comprises combined data or separate data. Combined data includes tissue or flow data for each or a subset of the pixels associated with an image or a region of the patient. For example, B-mode and Doppler data are provided for each spatial location or pixel associated with a part of a DICOM or ultrasound image. As another example, one of B-mode or Doppler data is provided for each pixel or location within a scanned region of the patient."

This portion of the applied art described storing ultrasound data as image data. Acquired data comprises combined data or separate data, with the combined data including tissue data or flow data for each. The combined data also includes a subset of pixels associated with an image or region of a patient. B-mode data or Doppler data are provided for each pixel or location in an example. So, aspects of the data are described in connection with an image, but there is no disclosure of surveying the image. Stated differently, data are described in the context of an image but there is no disclosure of a method that includes use of the image, and especially the surveying of the image as specifically claimed.

Finally, while the display 26 may be used to display an image, and borders thereof, there is no disclosure of surveying of anything provided on the display, especially the image.

The Advisory Action states:

"Thus, as best understood by the examiner, the limitation "Doppler processor 18 detects a Doppler image data that representing flowing fluid of the Vessel border inherently teaches "surveying the image to collect motion data.""

Applicants respectfully submit that inherency has not been established. To this end, M.P.E.P. § 2112 IV provides that:

*EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE TENDING*

*TO SHOW INHERENCY*

*The fact that a certain result or characteristic **may** occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).*

(emphasis added).

Furthermore, a claim rejection must be based on objective evidence of record, and cannot be supported merely on subjective belief and unknown authority. See, e.g., M.P.E.P. § 2144.03; In re Lee, 277 F.3d at 1344-45, 61 USPQ2d at 1434-35 (Fed. Cir. 2002); In re Zerko, 258 F.3d at 1386, 59 USPQ2d at 1697.

No such concrete evidence has been provided by the Examiner here, nor did the Examiner submit an affidavit as required by 37 C.F.R. § 1.104(d)(2) if this proposed motive were based on facts within his personal knowledge (see M.P.E.P. § 2144.03). Applicants respectfully request that such an affidavit be provided if a rejection continues to be made without a citation of any objective evidence.

ii. Claim 12

Claim 12 recites:

*An ultrasound system, comprising:*

> **a survey system for collecting motion data from a target image;**

> *a segmentation system for mapping a region of flow within the image based on the motion data; and*

> *a flow acquisition system that automatically limits the collection of flow image data within the image to the region of flow.*

In rejecting claim 12, the Office Action directs Applicants to essentially the same portions of *Sumanaweera* as were applied in the rejection of claim 1. As such, Applicants' position in traversing the rejection of claim 1 are germane to the rejection of claim 12, and are not repeated in the interest of brevity.

Applicants nonetheless traverse the rejection of claim 12 for at least the following additional reasons. For the rejection of the emphasized portion of claim 12, the Office Action states (with reference to *Sumanaweera*):

> **"the system includes the Doppler processor 18 detects a Doppler data that representing flowing fluid of a Vessel border or organ. These data are analyzed and displayed on the display."** (Emphasis original.)

Applicants respectfully submit that this is not that which is claimed. Specifically, the survey system of claim 12 **collects data from an image**. The Office Action describes **displaying data on a display**. Thus, there is a clear difference between that which is disclosed in *Sumanaweera* and that which is claimed in claim 12.

For at least the reasons set forth above, Applicants respectfully submit that the applied art fails to disclose at least on feature of claim 1 and at least one feature of claim 12.

### iii. Prima Facie Anticipation has not been established

Accordingly, and for at least the foregoing reasons, Applicants respectfully submit that a *prima facie* case on anticipation has not been established and claims 1 and

12 are therefore patentable over the applied art. Claims 2-11 and 13-19, which depend from claims 1 and 12, respectively, are also patentable for at least the same reasons and in view of their additionally recited subject matter.

## Conclusion

In view the foregoing, applicant(s) respectfully request(s) that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application in condition for allowance.

If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted on behalf of:

Phillips Electronics North America Corp.

___/William S. Francos/_____

by: William S. Francos (Reg. No. 38,456)

Date: July 21, 2009

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# APPENDIX

## Claims on Appeal

1. A method of capturing an image using an ultrasound system, comprising:

   surveying the image to collect motion data;

   analyzing the motion data to identify a flow in the image; and

   scanning a limited region of the image containing the flow with a flow imaging

technique.

2. The method of claim 1, wherein surveying step comprises the step of collecting a sample of color flow data.

3. The method of claim 2, wherein surveying step comprises the step of collecting contour data.

4. The method of claim 1, wherein the analyzing step generates a motion map that identifies flow and non-flow regions.

5. The method of claim 1, wherein the flow imaging technique includes a technique selected from the group consisting of: color flow, time domain correlation, speckle tracking, strain imaging, pulse wave Doppler, and continuous wave Doppler.

6. The method of claim 1, wherein the flow is associated with a valve in a heart.

7. The method of claim 1, wherein the flow indicates a blood vessel.

8. The method of claim 1, wherein the scanning step uses multi-line beamforming.

9. The method of claim 1, wherein the flow is periodically tracked and the limited

region of the image containing the flow is automatically adjusted.

10. The method of claim 1, wherein the limited region for acquisition is a region selected from the group consisting of a 3D pie slice, a cube, an arbitrary shape, and a collection of shapes.

11. The method of claim 1, wherein the scanning step includes adjusting a set of acquisition parameters selected from the group consisting of b-mode line densities, colorflow line densities, pulse repetition frequency, and ensemble length.

12. An ultrasound system, comprising:

a survey system for collecting motion data from a target image;

a segmentation system for mapping a region of flow within the image based on the motion data; and

a flow acquisition system that automatically limits the collection of flow image data within the image to the region of flow.

13. The ultrasound system of claim 12, wherein the motion data comprises color flow data.

14. The ultrasound system of claim 13, wherein the motion data comprises contour data.

15. The ultrasound system of claim 12, wherein the flow acquisition system collects data using an imaging technique selected from the group consisting of: color flow, time domain correlation, speckle tracking, strain imaging, pulse wave Doppler, and continuous wave Doppler.

16. The ultrasound system of claim 12, wherein the flow acquisition system uses multi-line beamforming.

17. The ultrasound system of claim 12, wherein the region of flow is periodically tracked and automatically adjusted.

18. The ultrasound system of claim 12, wherein region of flow is a region selected from the group consisting of a 3D pie slice, a cube, an arbitrary shape, and a collection of shapes.

19. The ultrasound system of claim 12, wherein the flow acquisition system includes a set of acquisition parameters selected from the group consisting of: b-mode line densities, colorflow line densities, pulse repetition frequency, and ensemble length.

# APPENDIX

## Evidence

# APPENDIX

## Related Proceedings

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